**Nabil Fayoumi**

02/20/2003 09:58 AM

To: sdsmit cc: rswill1, pbarrett, Sandra.Bron, Kevin_de_la_Bruere, mhenry
Subject: Review Comments/Notice of Deficiency (NOD) for the Groundwater Migration Control System - Prefinal Design Document, Sauget Area 2 Site - St. Clair County, Illinois

Dear Mr. Smith:

The United States Environmental Protection Agency (U. S. EPA) received the Prefinal Design Document for the Groundwater Migration Control System for the Sauget Area 2 Site on January 21 and 31, 2003.

The attached file contains the U.S. EPA's comments/notice of deficiency (NOD) for the Prefinal Design Document. I also attached the Conditional Approval Letter of the RD/RA Workplan that was mailed to you on February 4, 2003. Please submit your responses to the Prefinal Design Document NOD and the Conditional Approval Letter of the RD/RA Workplan within 14 days of receipt of this e-mail. If there are any questions, please contact me at 312-886-6840.

Sincerely,

Nabil Fayoumi
Remedial Project Manager
Superfund Division

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FINAL-TECHNICAL MEMORANDUM SAUGET SITE

February 4, 2003

(SR-6J)

Mr. Steven D. Smith
Solutia, Inc.
P.O. Box 66760
St. Louis, Missouri 63166-6760

RE: Conditional Approval of Remedial Design/Remedial Action (RD/RA) Workplan (excluding the project schedule) for the Ground Water Migration Control System, Sauget Area 2 Site - St. Clair County, Illinois

The United States Environmental Protection Agency (U. S. EPA) has completed the review of the RD/RA Workplan which was submitted by Solutia on December 19, 2002. This Conditional Approval does not cover RA/RD's schedule. The Unilateral Administrative Order (UAO) requires the completion of the groundwater migration control system within 8 months from the effective data of the Order. This timeframe was agreed to by U. S. EPA, IEPA and Solutia at a meeting last year. The effective date of the UAO is 11/15/02 which means the project must be completed by 7/15/03. However, initiation of construction covered in the schedule provided in Figure 1 of the RD/RA Workplan is not scheduled until 6/17/03 and the barrier wall will not be complete until 2/2/04.

The U.S. EPA approves the above referenced document (excluding the schedule) in anticipation that the following comments will be addressed as part of the Prefinal Design document:

- The completion of the project should not be contingent on the ability of Solutia to obtain a permit to discharge the extracted groundwater to the American Bottom POTW. Alternative disposal options were suggested and should have been investigated concurrently during the past year as Solutia attempts to obtain a discharge permit from POTW.

- Section 3 (Remedial Design) states that the volume of spoils and waste from drill cuttings potentially generated during the installation of the jet grout wall could be "up to 40,000 cubic yards". This seems like a large volume given that one of the chief advantages of the jet grout wall installation is the generation of little or no spoil. The Prefinal Design document should include the assumption behind this.

- Section 2 describes the conceptual design and construction of the barrier wall. The plan states that several design tasks are ongoing including mapping the bedrock surface, evaluating compatibility of grout mix with onsite groundwater, and constructing a test cell to assess jet grout geometry and installation methods. In addition, a groundwater extraction system consisting of three partially-penetrating wells is planned. It is important that these tasks be described in detail in the Prefinal Design document so that the various approaches may be properly evaluated and refined as necessary.

Section 2 also summarizes the proposed groundwater monitoring program and the sediment/surface water monitoring program. The former states that four clusters of three monitoring wells will be constructed for water quality monitoring and that four sets of piezometer pairs will be constructed to monitor water levels on either side of the barrier wall. The locations of these monitoring points should be presented on a figure.

Regarding the sediment/surface water monitoring program, the workplan states that an Apparent Effects Threshold and Toxic Units Approach will be used to establish protective constituent concentrations for two media. The used methodologies along with any technical assumptions made should be clearly described in the Prefinal Design document.

- Section 2.2.11, Page 2-1, the Prefinal Design submittal, referenced under Section 3.3, must include design assumptions and parameters for the single panel barrier wall.

- Section 2.2.1.1, Page 2-2, Second Paragraph, the Upper Hydrogeologic Unit is described as representing 1 percent of the total flux discharging to the river, based on groundwater modeling performed during the Focused Feasibility Study ("FFS"). The Prefinal Design document must include specific references to the groundwater modeling in the FFS.

Last Paragraph, the Prefinal Design document must include a technical explanation for how "minimal gaps" and "minor discontinuities" will require higher pumping rates to equalize groundwater levels on the upgradient and downgradient sides of the barrier. It would appear that gaps and discontinuities would tend to equalize groundwater levels on the upgradient and downgradient sides. Further, since the pumping rate will be adjusted to maintain equal levels upgradient and downgradient, as opposed to creating a zone of depression, it would appear the pumping rate adjustment cannot be used to compensate for gaps or discontinuities in the wall.

- Section 2.2.2.2, Pages 2-4, 2-5, First Bullet, the Prefinal Design document must explain the rationale for not screening the piezometers across the Shallow Hydrogeologic Unit, given that the wall will not extend into the Shallow Hydrogeologic Unit. The piezometers should measure the performance of the wall design. Additionally, details on how the pump rate will be primarily controlled by the river level must be included in the Prefinal Design document, subject to approval. Finally, the water level differentials need to be the "same", as written in the FFS (p.1-27), not "minimized".

- Section 2.3, Page 2-6, a brief discussion should be provided on the role of the U. S. EPA, IEPA, and the oversight contractor.

- Section 3.5.1, Page 3-4, add a bullet item for "summary of inspection activities including the pre-construction meeting, regular progress meetings, pre-final and final inspections, etc."

The CQAP needs to specify procedures that will be followed for notification/approval of project modifications, including a description of minor, significant changes during construction, and notifications/review/approval process for changes during construction.
- Section 4, the remedial action described in this section does not address the construction of the "test cell" mentioned in Section 2. Also, the schedule provided as Figure 1 does not include any information regarding test cell construction. The construction and evaluation of the test cell is a key component of the project and should be detailed in a support technical memorandum prior to the Prefinal Design document review and approval.

- Section 4.2, Page 4-2, add a section for regular progress meetings, between the pre-construction inspection, and the prefinal inspection.

If you have any questions regarding this letter, please do not hesitate to contact me at 312/886-6840.

Sincerely,

Nabil Fayoumi
Remedial Project Manager

cc: Thomas Martin, USEPA
Peter Barrett, CH2M HILL
Sandra Bron, IEPA
Kevin de la Bruere, USFWS
Michael Henry, IDNR

bcc: File Room

# Groundwater Migration Control System - Prefinal Design Review

**PREPARED FOR:** Nabil Fayouli/USEPA Region V

**PREPARED BY:** Peter Barrett/CH2MHILL

**COPIES:** Ike Johnson/CH2MHILL
Ning Li/CH2MHILL

**DATE:** February 19, 2003

CH2MHILL has reviewed the documents provided by Solutia. They are:

- Volume 1 Geotechnical Data (incl. Attachments 4.1 and 4.2)
- Volume 2 Construction Quality Assurance Plan
- Volume 3a Filed Sampling Plan
- Volume 3b Quality Assurance Project Plan
- Volume 4 Contingency Plan

Our review focussed upon Volumes 1, 2, 3a, and 4. Because the project is a construction effort, a less-detailed review of Volume 3b (QAPP) was done. This presumes that the approved QAPP for the Sauget Area 2 RI/FS will also apply to the performance sampling associated with the GMCS construction; however this is not stated directly in Volume 3a.

## General Comments

The workplans would benefit from additional technical details and better quality construction figures. A general lack of technical specificity within the text makes it difficult to fully understand or constructively critique the proposed project.

The number of proposed performance monitoring points - four pairs of piezometers and five sediment and surface water sampling locations - seems inadequate given the fact that the proposed barrier wall is 3,300 feet long: It is recommended that a minimum of four additional piezometer pairs be added and four sediment/surface water sampling stations be added to provide better and more consistent spatial coverage along the barrier wall.

## Comments on Volume 1 and Volume 2.

### Section 4.1.4 - Permeability and Strength

A higher permeability wall than $1x10^{-6}$ cm/sec would add significantly to the O&M costs for the pumping and extraction system. What is the highest permeability value that would be acceptable? Also, what would be the minimum acceptable unconfined compressive strength for the grout material?

### Section 4.2 - Basis of Barrier Design

What is the schedule for contractor selection and final design submittal? What are the criteria for selecting the contractor? Have any of the potential contractors installed barrier walls, using the methods described, to depths and into dense granular soil conditions similar to those found at this site?

### Section 4.3.2 - Construction Sequence

What testing methods will be used to measure performance of the barrier wall? What grouting data will be collected, for example, pressures and grout takes over time? How will the grout-take and pressure data be compared to values expected for the formation? If no additional submittal is anticipated, how will the final site-specific design details be documented? Without additional design criteria, the EPA field observer will not be able to evaluate the if the results are satisfactory based on the pre-production tests. No specific criteria or performance measures are presented in this predesign submittal. A final design submittal should also be completed to document the results of the field tests.

### Section 4.4.1 - Volume and Type of Spoils

Is the 30,000 CY estimate based on only one of the potential methods or is this a conservatively high estimate based on several of the potential construction methods? Will this estimate be revised based on the contractor and methods actually selected?

### Specifications Section 3210 - Jet Grouted Groundwater Barrier

How will the pump test data be evaluated to determine the wall permeability? See comments and questions above. Additional quality control data is needed, including grout take volumes and pressures for each stage to document grout movement.

## Comments on Volume 3a and 3b

### Section 3.1.2 Groundwater Level Monitoring

The proposed locations of the four piezometer pairs appear to be next to the proposed monitoring well locations. This leaves at least six hundred feet between water level measuring stations. It is recommended that two additional piezometer pairs be added or the piezometer locations be moved to points in-between the monitoring well clusters to provide better linear coverage of water levels along the entire barrier wall length.

Also, there are no piezometers proposed for the two E-W wings of the barrier wall. It is recommended that two piezometer pairs be added along each wing to monitor hydrostatic pressures along the wing walls.

There are no construction details for the monitoring wells or the piezometers. For example, how far away from the actual wall will the wells and piezometers be placed? How deep will the wells and piezometers be installed? Appendix D is supposed to provide details of monitoring well construction but the associated diagrams are missing. These and other construction details (for example – piezometer construction) need to be provided.

Paragraph 3 states that pumping rates will not be adjusted unless head differentials persist for "one or two days". Which is it – one day or two? What is the rationale behind this?

Figure 2 – Performance Monitoring Sample Locations – is of poor quality and is largely illegible. A larger format map is required along with call-outs or individual drawings that provide details of each monitoring well cluster and piezometer pairing. Additionally, a geological section illustrating the relationship between the proposed wells and piezometers and the designated hydrogeologic units would be useful.

## Section 3.1.3 – Sediment and Surface Water Monitoring

The text states that an Apparent Effects Threshold approach will be used to establish performance monitoring action levels for sediments and that a Toxic Units approach will be used to derive performance monitoring action levels for surface water. It is important to provide detailed methodologies that explain and justify these approaches for establishing action levels for sediments and surface water.

## Section 5.3.1 – Surface Water Monitoring

What is the rationale for selecting sediment/surface water sampling locations 2, 3, 4, 5, and 9? These locations do not appear to represent a consistent sampling approach. Also, please explain why there are no reference upgradient or downgradient sampling locations proposed.